

WHAT IS CLAIMED IS:

1. A moving picture encoding apparatus for encoding successive input image signals, comprising:

block significance determining means for determining block significance for each block as an encoding unit of the input image signals according to evaluation indices predetermined;

map generating means for generating, according to the block significance, a refresh map signal representing priority of refresh processing for each block;

adaptive refresh signal generating means for referring to refresh priority indicated by the refresh map signal and an allowed number of blocks for refresh processing in a frame to be encoded, selecting a block for refresh processing, and generating a refresh signal specifying the block for refresh processing; and

moving picture encoding means for conducting an intra-frame encoding operation for a block specified by the refresh signal and for appropriately selecting and executing an intra-frame encoding operation or an inter-frame forecast encoding operation for a block not specified by the refresh signal.

2. A moving picture encoding apparatus in accordance with claim 1, wherein

the block significance determining means includes:

block feature calculating means for calculating for each block a block feature which is a quantity representing a feature of signal distribution of the block and a visual characteristic of the block; and

significance generating means for comparing the block feature with one or more threshold values and thereby generating block significance for each block.

3. A moving picture encoding apparatus in accordance with claim 1, wherein

the block significance determining means includes:

5 block feature calculating means for calculating a block feature which is a quantity indicating a variance of intra-block signals; and

significance generating means for comparing the block feature with one or more threshold values and thereby generating block significance for each block.

4. A moving picture encoding apparatus in accordance with claim 1, wherein

the block significance determining means includes:

5 block feature calculating means for calculating for each block a block feature which is a quantity indicating power of a signal obtained by passing intra-block signals through a band-pass filter; and

significance generating means for comparing the block feature with one or more threshold values and thereby generating block significance for each block.

5. A moving picture encoding apparatus for encoding successive input image signals, comprising:

5 block significance determining means for determining block significance for each block as an encoding unit of the input image signals according to block information and evaluation indices predetermined;

map generating means for generating, according to the block significance, a refresh map signal representing priority of refresh processing for each block;

10 adaptive refresh signal generating means for referring to refresh priority indicated by the refresh map signal and an allowed number of blocks for refresh processing in a frame to be encoded, selecting a block for refresh processing, and generating a refresh signal specifying the block for refresh processing; and

15 moving picture encoding means for generating the block information indicating power of an error between frames and a quantity of motion generated during a block encoding operation and sending the block information to the block significance determining means, for conducting an intra-frame encoding operation for a block
20 specified by the refresh signal and for appropriately selecting, and for executing an intra-frame encoding operation or an inter-frame forecast encoding operation for a block not specified by the refresh signal.

6. A moving picture encoding apparatus in accordance with claim 5, wherein

the block significance determining means includes:

5 block feature calculating means for calculating for each block a block feature which is a quantity representing a feature of signal distribution of the block and a visual characteristic of the block;

first significance generating means for comparing the block feature with one or more threshold values and thereby generating first block significance for each block;

10 visual deterioration calculating means for calculating for each block, according to the block information, a quantity of visual deterioration representing a degree of visual picture deterioration when a forecast error signal is lost;

15 second significance generating means for comparing the quantity of visual deterioration with one or more threshold values and thereby generating second block significance for each block; and

block significance totaling means for combining the first block significance with the second block significance and supplying resultant block significance to the map generating means.

7. A moving picture encoding apparatus in accordance with claim 5, wherein

the block significance determining means includes:

block feature calculating means for calculating for each block

5 a block feature which is a quantity representing a feature of signal distribution of the block and a visual characteristic of the block;

first significance generating means for comparing the block feature with one or more threshold values and thereby generating first block significance for each block;

10 visual deterioration calculating means for calculating for each block a quantity of visual deterioration representing a quantity of power of an error between a block in the input image signal and a block in a reference frame, the blocks being respectively at the same position;

15 second significance generating means for comparing the quantity of visual deterioration with one or more threshold values and thereby generating second block significance for each block; and

20 block significance totaling means for combining the first block significance with the second block significance and supplying resultant block significance to the map generating means.

8. A moving picture encoding apparatus in accordance with claim 5, wherein

the block significance determining means includes:

block feature calculating means for calculating for each block
 5 a block feature which is a quantity representing a feature of signal
 distribution of the block and a visual characteristic of the block;

first significance generating means for comparing the block
 feature with one or more threshold values and thereby generating first
 block significance for each block;

10 visual deterioration calculating means for calculating for
 each block a quantity of visual deterioration representing a quantity of
 power of an error between a block in the input image signal and a
 block in a reference frame obtained by inter-frame forecast processing,
 the blocks being respectively at the same position;

15 second significance generating means for comparing the
 quantity of visual deterioration with one or more threshold values and
 thereby generating second block significance for each block; and

block significance totaling means for combining the first block
 significance with the second block significance and supplying resultant
 20 block significance to the map generating means.

9. A moving picture encoding apparatus in accordance with
 claim 5, wherein

the block significance determining means includes:

block feature calculating means for calculating for each block
 5 a block feature which is a quantity representing a feature of signal
 distribution of the block and a visual characteristic of the block;

first significance generating means for comparing the block
 feature with one or more threshold values and thereby generating first
 block significance for each block;

10 visual deterioration calculating means for calculating for
 each lock a quantity of visual deterioration representing a quantity
 obtained by weighting, according to a quantity of motion of a block,

power of an error between a block in the input image signal and a block in a reference frame, the blocks being respectively at the same position;

second significance generating means for comparing the quantity of visual deterioration with one or more threshold values and thereby generating second block significance for each block; and

block significance totaling means for combining the first block significance with the second block significance and supplying resultant block significance to the map generating means.

10. A moving picture encoding apparatus in accordance with claim 5, wherein

the block significance determining means includes:

block feature calculating means for calculating for each block a block feature which is a quantity representing a feature of signal distribution of the block and a visual characteristic of the block;

first significance generating means for comparing the block feature with one or more threshold values and thereby generating first block significance for each block;

visual deterioration calculating means for calculating for each block a quantity of visual deterioration representing a quantity obtained by weighting, according to a quantity of motion of a block, power of an error between a block in the input image signal and a block in a reference frame obtained by inter-frame forecast processing, the blocks being respectively at the same position;

second significance generating means for comparing the quantity of visual deterioration with one or more threshold values and thereby generating second block significance for each block; and

block significance totaling means for combining the first block
 20 significance with the second block significance and supplying resultant
 block significance to the map generating means.

11. A moving picture encoding apparatus in accordance with
 claim 5, wherein

the block significance determining means includes:

5 block feature calculating means for referring to information
 of a change in luminance of intra-block signals and a luminance level,
 thereby generating sensitivity information for the information
 according visual characteristics of a human, and calculating the
 sensitivity information as a quantity of a block feature;

10 first significance generating means for comparing the block
 feature with one or more threshold values and thereby generating first
 block significance for each block;

visual deterioration calculating means for calculating for
 each block, according to the block information, a quantity of visual
 deterioration representing a degree of visual picture deterioration
 15 when a forecast error signal is lost;

second significance generating means for comparing the
 quantity of visual deterioration with one or more threshold values and
 thereby generating second block significance for each block; and

20 block significance totaling means for combining the first block
 significance with the second block significance and supplying resultant
 block significance to the map generating means.

12. A moving picture encoding apparatus for encoding
 successive input image signals, comprising:

block significance determining means for determining block
significance for each block as an encoding unit of the input image
5 signals according to evaluation indices predetermined;

map generating means for generating, according to the block
significance, a refresh map signal representing priority of refresh
processing for each block;

refresh history determining means for temporarily keeping
10 therein the refresh map signal from the map generating means,
referring to history of the refresh map signal and a refresh signal,
modifying a value of forced refresh priority indicated by the refresh
map signal, and thereby generating a modified refresh map signal;

adaptive refresh signal generating means for referring to
15 refresh priority indicated by the refresh map signal and an allowed
number of blocks for refresh processing in a frame to be encoded,
selecting a block for refresh processing, and generating the refresh
signal specifying the block for refresh processing; and

moving picture encoding means for conducting an intra-frame
20 encoding operation for a block specified by the refresh signal and for
appropriately selecting and executing an intra-frame encoding
operation or an inter-frame forecast encoding operation for a block not
specified by the refresh signal.

13. A moving picture encoding apparatus in accordance with
claim 12, wherein

the refresh history determining means includes:

a map history memory for referring to the refresh map signal
5 from the map generating means and the refresh signal from the
adaptive refresh signal generating means, thereby updating history,
beginning at a start of encoding processing, of a refresh map, and
storing therein the refresh map;

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